Before the
FEDERAL COMMUNICATIONS COMMISSION
Washington, DC 20554

In the Matter of	)	
	)	
Request by Auspion Inc.	)	ET Docket No. 19-83
For Waiver of Section 18.107(c)	)	
of the Commission's Rules	)	

COMMENTS OF NIKOLA LABS

Nikola Labs LLC ("Nikola Labs") submits these comments regarding the Request for Waiver filed by Auspion Inc. ("Auspion").[1] Auspion's Waiver Request asks the Office of Engineering and Technology ("OET") to waive application of the clause in Sections 2.1(c) and 18.107(c) of the rules of the Federal Communications Commission ("Commission") that requires radiofrequency ("RF") energy to be generated and used locally by industrial, scientific, and medical ("ISM") devices ("Local Use Clause").[2] Auspion requests the waiver in connection with its efforts to secure an equipment authorization for the marketing and operation of its non-consumer WiPod system that transmits wireless power over distance in the 24 GHz ISM frequency band.

[1] *See* Request for Waiver, Docket No. 19-83, filed by Auspion Inc. (filed Jan. 3, 2019) ("Waiver Request"); *Office of Engineering and Technology Seeks Comment on Auspion USA, Inc. Request for Waiver of ISM "Local Use" Requirement in Parts 2 and 18 for a 24 GHz Wireless Power Transfer Device Over Distance*, Public Notice, DA 19-211, Docket No. 19-83 (OET rel. March 26, 2019).

[2] 47 C.F.R. §§ 2.1(c), 18.107(c).

As further set forth herein, neither the Commission nor OET has formally adopted or published an interpretation of the Local Use Clause. As a result, it is not clear that Auspion's technology requires a waiver. If OET agrees that Auspion's WiPod system will not undermine the policies that OET intends to further under the Local Use Clause, then OET should issue a conditioned certification for the WiPod system, rather than granting Auspion a waiver. OET can impose whatever conditions on the certification that it deems appropriate under the Local Use Clause. This approach will provide OET and other wireless power transfer companies greater flexibility in the future to conditionally certify new and different wireless power transfer technologies. By contrast, grant of the Waiver Request would needlessly establish a generally applicable *de facto* compliance requirement in this adjudicative proceeding, and thereby force other, differently situated companies to seek administratively cumbersome waivers in the future. If OET nevertheless determines that it is required to issue a waiver for the WiPod system, it should narrowly tailor the waiver to avoid prejudging the compliance with the Local Use Clause of such new and different technologies for wireless power transfer over distance.

I. NIKOLA LABS IS A WIRELESS POWER TRANSFER COMPANY

Based in Columbus, Ohio, Nikola Labs is a wireless charging company that has developed a far-field technology to convert RF energy into usable direct current ("DC") power.[3] Consequently, the Commission's approach to the Waiver Request is important to Nikola Labs' business.

[3] *See* https://www.nikola.tech/. The Nikola Labs team includes world-renowned electrical engineers and distinguished business leaders united by a common goal–to advance wireless power into the marketplace. *See* https://www.nikola.tech/team. Additional information about Nikola Labs and its RF to DC technology can be found here: https://www.nikola.tech/library.

Nikola Labs' technology for wireless power transfer over distance is based on a novel RF energy harvesting circuit invented by its Chief Science Officer, Dr. Chi-Chih Chen, while he was a research professor at The Ohio State University's world-renowned Electroscience Laboratory. This technology, known as radio frequency to direct current, works by sending an RF signal from an existing or dedicated transmitter to a receiving device that converts radio waves into realizable power. The conversion is done by Nikola Labs' proprietary INDRA chip, which captures the RF energy on an antenna, rectifies the wave, boosts voltage, and manages the DC power to charge an electrical storage element inside the receiving device.[4]

II. NO RULE WAIVER IS REQUIRED FOR AUSPION'S WIPOD TECHNOLOGY

Auspion intends to seek equipment authorization of its WiPod system under the Commission's ISM rules. The ISM definitions set forth in Sections 2.1(c) and 18.107(c) of the Commission's rules both include a clause specifying that ISM devices are designed to generate and locally use RF.[5] As Auspion states in its Waiver Request, however, "the Commission has not officially examined when a technology that transfers power over distance constitutes 'local' use

[4] The INDRA chip measures only 5.6mm x 3mm x 0.8mm. Developed with Texas Instruments and Skyworks Solutions, INDRA is a miniaturized version of Nikola Labs' efficient RF-to-DC circuitry. INDRA was specifically designed to power Internet of things devices, such as industrial sensors, which, with the addition of wireless power, can provide uninterrupted data without the need to ever change batteries. *See* https://www.nikola.tech/indra.

[5] Section 2.1(c) defines the term "Industrial, Scientific and Medical (ISM) (of radio frequency energy) Application" to mean "operation of equipment or appliances designed to *generate and use locally* radio-frequency energy for industrial, scientific, medical, domestic or similar purposes, excluding applications in the field of telecommunications." 47 C.F.R. §2.1(c) (emphasis added). Section 18.107(c) defines the term "Industrial, scientific, and medical (ISM) equipment" to mean "equipment or appliances designed to *generate and use locally* RF energy for industrial, scientific, medical, domestic or similar purposes, excluding applications in the field of telecommunication." 47 C.F.R. §18.107(c) (emphasis added). The rule lists several examples of ISM applications: the production of physical, biological, or chemical effects such as heating, ionization of gases, mechanical vibrations, hair removal and acceleration of charged particles. *Id.*

or how these technologies could fit into the Commission's regulatory scheme."[6] In light of this, if OET agrees with Auspion that the WiPod system will not undermine the Commission's rules, including the Local Use Clause, Auspion should not need a waiver. Instead, OET should evaluate the WiPod system for certification using the Commission's pre-approval equipment authorization ("PAG") procedures.[7]

A. Neither the Commission nor OET Has Defined the Scope of the Local Use Clause

The Commission has not published any guidance regarding the proper application of the Local Use Clause. OET, in turn, only has stated that *consumer* wireless power transfer devices over distance require prior OET approval.[8] OET has granted certification of several such consumer devices under its PAG procedures.[9] Further, OET has not yet addressed how Part 18 of the Commission's rules should apply to *non-consumer* wireless power transfer devices.[10] In addition, although Auspion asserts that the "Commission staff view 'local' in the context of

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[6] Waiver Request at i; *see also id.* at 8 ("The Commission has never provided clear guidance on what constitutes 'local' generation and use of RF energy."); *id.* at 9 ("The Commission has not opined on the meaning of "generate and use locally."); *id.* at 9-10 ("[T]he Commission has not provided guidance with regard to wireless power over distance technologies and what specific technologies or operations may qualify as Part 18 ISM equipment.").

[7] *See* 47 C.F.R. § 2.964 (setting forth the Commission's pre-approval guidance procedures).

[8] *RF Exposure Considerations for Low Power Consumer Wireless Power Transfer Applications*, KDB 680106 D01, RF Exposure Wireless Charging App v03, at 2 (April 9, 2018), available at https://apps.fcc.gov/kdb/GetAttachment.html?id=Ai9uISYvaQ1Z0wVtOIHXXg%3D%3D&desc=680106%20D01%20RF%20Exposure%20Wireless%20Charging%20Apps%20v03.pdf&tracking_number=41701 ("Part 18 of the rules permit devices operating in the Industrial, Scientific and Medical (ISM) band to generate and use RF energy locally to perform work. For consumer devices this operation must be in close proximity and the RF energy must not be used for communications.").

[9] *See, e.g.*, Energous Corporation device with FCC ID: 2ADNG-MS300 (granted 12/26/2017); Powercast Corporation device with FCCID: YESTX91501B (granted 10/25/2018).

[10] Waiver Request at 10.

power transfer to mean transmission within a set distance of perhaps up to three feet,"[11] any such informal determination by the OET staff has never been published. Even if OET had issued a Knowledge Database posting ("KDB") imposing such a three-foot requirement, Auspion explains that KDBs "are considered supplemental guidance rather than formal rules, and are not binding on the Commission."[12] Consequently, Auspion appears to request waiver of a Commission requirement that has not yet been adopted.

B. OET Should Issue a Certification of the WiPod System with Appropriate Conditions, Rather Than Acting on the Waiver Request

Based on the foregoing, Auspion should not require, and OET should not grant, a waiver of the Local Use Clause. Instead, in a circumstance such as this where there has been no published interpretation of a potential equipment authorization standard, OET should continue to utilize its PAG procedures to evaluate wireless power transfer devices such as the WiPod system on a case-by-case basis. If OET ultimately agrees with Auspion that the WiPod system does not undermine the purpose of the Commission's ISM rules,[13] then OET should grant certification for the WiPod system subject to whatever conditions, if any, OET believes are necessary and appropriate under the Local Use Clause.[14] No waiver is necessary.

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[11] Waiver Request at i.

[12] Waiver Request at 10 (citing *Amendment of Parts 0, 1, 2, 15 and 18 of the Commission's Rules regarding Authorization of Radiofrequency Equipment*, First Report and Order, 32 FCC Rcd 8746 at n. 232 (2017)).

[13] *See* Waiver Request at 18-19. Auspion also explains that the WiPod system will not cause harmful interference. *See id.* at 15-17. This is not germane to the Waiver Request, however, because ISM devices are not permitted by the Commission's rules to cause harmful interference to authorized services outside of the ISM bands. By making this statement, Auspion merely is committing to comply with the interference rules, rather than justifying a departure from the rules.

[14] The preferable means of adopting the approach outlined in these comments is for Auspion and OET to collaboratively work towards a conditioned certification of the WiPod system and for Auspion to withdraw its Waiver Request. In the alternative, OET unilaterally could issue a

Fleshing out the scope of the Local Use Clause through conditioned certifications, rather than by requiring waivers, offers important public interest benefits. First, the waiver process can be time consuming, and speed to market is crucially important to the success of companies developing innovative new technologies. Regulatory delay that prevents a company, especially an emerging company, from monetizing its new technology in a commercially reasonable timeframe can be crippling and can cause the company to lose a first-to-market competitive advantage. On a global scale, such delay also can cost the United States its leadership position in a new technology by enabling non-U.S. technologies and standards to capture the international market while U.S. competitors are awaiting regulatory approvals.

Second, relying on conditioned certifications to interpret the Local Use Clause will avoid the adoption of an overly restrictive *de facto* compliance standard through a single waiver decision.[15] It is preferable for OET to reach a conclusion regarding what *is* compliant with the Local Use Clause by issuing a conditioned certification, rather than expressly defining for the first time in this proceeding what *is not* compliant, which OET presumably would have to do to issue Auspion a waiver. A conditioned certification preserves future flexibility regarding the proper interpretation of the Local Use Clause for both OET and the wireless power transfer industry. A waiver, by contrast, locks in now a potentially arbitrary bright line that may not be

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decision declining to grant the Waiver Request, expressly determining that no waiver is required in this instance, and setting forth a procedure for seeking conditioned certification of non-consumer wireless power transfer devices using PAG procedures.

[15] Ultimately, given the importance to numerous technologies of the rapid evolution of the capability to transfer wireless power over distance, it may be appropriate for the Commission to initiate a rulemaking proceeding to determine the proper scope of the Local Use Clause, as well as to resolve other regulatory issues raised by wireless power transfer, such as RF exposure concerns. However, while any such rulemaking is pending, OET must continue to review and act on equipment authorization applications for wireless power transfer devices. Failure to do so would fundamentally undermine the ability of U.S. companies to compete in, and continue to lead, this emerging and important international market.

appropriate for, and may be difficult to apply to, other new, innovative, and different wireless power transfer technologies. By requiring Auspion to obtain a waiver, OET may inadvertently and prematurely establish a fixed compliance standard that forecloses the ability of other companies to seek certification for their disparate technologies without first undertaking a lengthy waiver process.

This, in turn, could force other companies to decide between designing their system to conform to OET's Auspion decision and seeking a time-consuming waiver. For example, OET could arbitrarily determine in this proceeding that wireless power transfers of more than three feet do not qualify as "local" under the ISM definition.[16] If so, each company seeking an equipment authorization going forward may have to choose between artificially constraining their technology to a three-foot maximum transmission distance and seeking a waiver of this new three-foot standard. Yet the technology employed by these other companies may not raise the same concerns as Auspion's WiPod system. For this reason, conditioning individual certifications in a manner appropriate to the underlying wireless power transfer technology is preferable to using waivers to accomplish the Commission's objectives under the Local Use Clause.

[16] As explained by Auspion in the Waiver Request, the definition of ISM adopted by the Radiocommunications Sector of the International Telecommunications Union (ITU-R) also includes a Local Use Clause. *See* Waiver Request at 9 & n.22; *see also Limitation of Radiation from Industrial, Scientific and Medical (ISM) Equipment*, Recommendation ITU-R SM.1056, at 1 ("ITU Recommendation"). However, unlike the Commission, the ITU-R does not appear to envision imposing a maximum separation distance between a transmitter and receiver via the Local Use Clause. ITU-R lists long-distance power transfer applications, including power transfer involving satellites and the powering of aircraft, vehicles, and other electromagnetic propulsion systems, as ISM applications that "promise[s significant social and economic benefits, which may not be available by any other process." ITU Recommendation at 5, 6.

III. ANY WAIVER GRANTED BY OET SHOULD BE NARROWLY TAILORED

If OET nevertheless determines that the WiPod system requires a waiver of the Local Use Clause, OET should try not to establish extensive or broadly applicable *de facto* compliance requirements in this adjudicative proceeding. It should instead draft its waiver order as narrowly as possible. To grant Auspion a waiver, OET presumably will need to explain what legal requirement it is waiving. As set forth above, this explanation will represent the first instance in which OET has published technical restrictions interpreting the Local Use Clause. For this reason, OET should clearly and unambiguously state the exact Local Use Clause technical standard that it is waiving, and this standard should be as narrow as possible while still accomplishing OET's public policy objectives. This approach may leave OET flexibility to grant certifications (with appropriate conditions, as needed) to other companies proposing different technologies—without being bound by an overly broad Auspion waiver precedent.

For example, Auspion offered waiver conditions including, *inter alia*, restricting consumer or residential use, requiring professional installation, maintaining customer lists, and beamforming to create "power spots."[17] While such limitations may be compatible with Auspion's equipment and its business plans, such impairments may not be compatible with other manufacturers' planned devices. Consequently, these types of conditions should not be incorporated into any grant of Auspion's Waiver Request. Doing so effectively will make them *de facto* requirements under the Local Use Clause. Instead, conditions like these are best imposed as part of OET's certification of a wireless power transfer system.

[17] Waiver Request at 16, 17.

IV. CONCLUSION

Nikola Labs does not believe the waiver requested by Auspion is necessary because the WiPod system does not violate any prior Commission or OET interpretation of the Commission's rules, including the Local Use Clause. If OET has concerns about Auspion's proposed technology, it should attempt to address them through certification conditions, rather than by issuing a waiver. Issuance of a waiver will result in new, generally applicable *de facto* technical standards under the Local Use Clause. If OET nevertheless determines that it must grant a waiver, OET should issue a waiver that is as narrow as possible to leave it maximum flexibility when addressing future certification applications.

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